California Department of Food & Agriculture
Pierce's Disease Control Program
Pierce's Disease & Glassy-winged Sharpshooter Board

University of California
Agriculture and Natural Resources
Pierce's Disease Research Grants Program

Request for Pierce's Disease Research Proposals

- Issued November 9, 2007 -

The California Department of Food and Agriculture (CDFA) Pierce's Disease and Glassy-winged Sharpshooter (PD/GWSS) Board and the University of California (UC) Pierce's Disease Research Grants Program are accepting proposals for Biological and Economic research projects on Pierce's disease and its vectors.

- Biological Research Proposals: Projects are being sought that will contribute to finding solutions to this serious disease of grapevines and that are relevant to California conditions. All proposals received will be considered to be submitted to both programs. Thus, each proposal must have two versions of the same budget, one under the format for each program. Proposals will be evaluated by a unified process. However, the CDFA program and the UC program will separately identify those projects that each program will support.
- Economic Research Proposals: Projects are being sought that will contribute to an understanding of the economic impact of PD/GWSS on agriculture. All proposals received will be considered to be submitted to CDFA only.

Proposals are due via electronic submission on Tuesday, January 15, 2008. Research contracts will be awarded for one to three years, beginning with fiscal year 2008-09 (July 1, 2008 to June 30, 2009). For projects awarded two or three years of funding, receipt of a subsequent year of funding will be contingent upon satisfactory progress being made during the prior year.

NEW FOR THE 2008-09 RFP

- Biological Research Proposals will be considered to be submitted to both the CDFA and the UC programs. The budgets for such proposals should be submitted in two formats, one for each program.
- The CDFA program will accept and consider Economic Research Proposals for economic research on PD/GWSS and its impacts and possible solutions.
- Proposals for projects of up to three years duration will be accepted by both programs.
- Principal investigators are asked to submit a Letter of Intent to Submit a Proposal by Monday, December 17, 2007. The purpose of this letter is to aid the CDFA and UC programs in identifying and obtaining commitments from appropriate reviewers.
- There is no limit on the number of proposals on which an individual may appear. However, if the number of proposals received exceeds the anticipated capacity of the grant programs to obtain reviews, Principal Investigators submitting multiple proposals may be asked to withdraw one or more proposals.
- The CDFA Research Scientific Advisory Panel (RSAP) conducted an independent scientific review of PD/GWSS programs which was completed in August 2007. Attachment A of this RFP is a summary of the research priorities identified in the final report of the RSAP. The complete document is available online at http://www.cdfa.ca.gov/pdcp/. Proposals that address the key research needs outlined in Attachment A will be given priority for funding.
- Similar to federal grant programs, funded researchers may be required to post project information, including progress reports, data, and gene sequences, on designated websites.
- Definitions of Principal Investigator, Co-Principal Investigator, and Cooperator are provided.

General Information

- Proposal submissions should be consistent with the research recommendations provided in the report "PD/GWSS Research Scientific Review: Final Report" released in August of 2007 by the California Department of Food and Agriculture's Pierce's Disease Research Scientific Advisory Panel (see Attachment A).
- Funding preference will be given to projects deemed likely to yield results that expedite and/or directly yield applicable industry solutions or provide insight into the economic impacts of PD/GWSS and its possible solutions. Multi-disciplinary team projects are encouraged.
- Researchers are responsible for obtaining all required governmental permits for working with live plant pests. For more information, please visit the following websites:
    - California permits: http://www.cdfa.ca.gov/phpps/permitsandregs.html
    - Federal permits: http://www.aphis.usda.gov/ppq/permits/plantpest/index.html.
- Submitted proposals and progress reports will not be returned. Confidential information and materials should not be submitted.
- Periodic progress reports and a final report will be required for each funded project. Similar to federal grant programs, funded researchers may be required to post project information, including progress reports, data, and gene sequences, on designated websites (see Attachment B for more information). In addition, funded researchers are expected to attend and report on their progress at the annual Pierce's disease research symposium. (The proceedings from prior symposia are available at http://www.cdfa.ca.gov/pdcp/Research_Symposium_Index.html).
- This RFP document is available online at: http://www.cdfa.ca.gov/pdcp/Research.html

Timeline

- Request for Proposals Released ..... November 9, 2007
- Letter of Intent to Submit a Proposal due ..... December 17, 2007
- Proposals due ..... January 15, 2008
- Renewal Progress Reports due (2- and 3-year projects not in their last year) ..... February 28, 2008
- Award Notification from CDFA and UC ..... May 1, 2008
- Start Date for Projects ..... July 1, 2008

Eligibility

- Any individual or group affiliated with a university or governmental agency that has appropriate research capabilities is eligible and is encouraged to submit proposals. For the UC Program, the organization must be able to meet CSREES certification requirements (see "Additional Forms Required by the UC Program" on page 8 of the RFP).

Funding

- The CDFA Pierce's Disease Research Program is funded by a special assessment paid by the California winegrape industry.
- The UC Pierce's Disease Research Grants Program is funded by a special grant to the University of California from the USDA Cooperative State Research, Education, and Extension Service (CSREES). Availability of funds is contingent on inclusion of the special grant in the federal fiscal year 2008 budget for CSREES.

Format and Content of Research Proposals

- See Guidelines.

Definitions of Participant Responsibilities

- **Principal Investigator (PI)**: The Principal Investigator is the person with overall responsibility for the scientific conduct of the project and for expenditures of funds. Each project has only one PI.
- **Co-Principal Investigator (Co-PI)**: A Co-Principal Investigator is a person who receives research support or material of significant value from the project. A project may have more than one Co-PI.
- **Cooperator**: A Cooperator is a person who provides advice, materials, or data to the project, makes arrangements for advancement of project activities, uses results developed in the project, and/or carries out research in parallel to the project research and which is mutually beneficial. A Cooperator does not receive research support or material of significant value from the project. A project may have more than one Cooperator.

Letter of Intent to Submit a Proposal

PIs are requested to provide by December 17, 2007, a Letter of Intent to Submit a Proposal. This document should be no longer than one page in length (11 point Arial font, one-inch margins). The purpose of the Letter of Intent is to assist the CDFA and UC programs in identifying suitable reviewers early enough to secure their commitments to serve, since almost all written reviews are to be completed by late March 2008. Please provide the following information in your letter:

- PI name and title
- Co-PI(s) name(s) and title(s)
- Cooperator(s) name(s) and title(s)
- Proposed or tentative title of the proposal
- Principal objective(s) of the proposed research
- Experimental approach
- Name(s) of possible reviewer(s) of your proposal

Please submit your letter by December 17, 2007, as the attachment to an email addressed to mmcaruso@ucdavis.edu. *For this year, submission of Letters of Intent, though preferred, will not be a prerequisite to submitting a proposal in January.*

Review Process and Criteria

Proposals will be reviewed by *ad hoc* external reviewers and a review panel. In addition, the PD/GWSS Board's Research Screening Committee and the University of California's Pierce's Disease Research Grants Program Guiding Committee will review and make recommendations for funding of proposals by the respective programs. For the UC program, proposal budgets must be further reviewed and approved by CSREES before funds can be awarded.

Biological Research Proposals will be reviewed and evaluated in the following areas (100 points possible):

- **Objectives of Proposed Research/Relevance** - Are the objectives clearly stated, justified, worthwhile, and reasonable and consistent with priorities outlined in Attachment A? Is the proposed research likely to contribute significantly to Pierce's disease mitigation as envisioned by the investigator-assigned numbering of Attachment A? Is the proposed project non-redundant with other research? (25 points)
- **Experimental Procedures to Accomplish Objectives** – Is the work plan reasonable, feasible and capable of meeting the stated goals and objectives? Is the work plan of good scientific merit? (35 points)
- **PI, Co-PI(s) & Cooperators** – Do they have appropriate backgrounds, expertise, experience and capabilities for the proposed tasks? Is the team missing any critical capabilities? (10 points)
- **Research Capacity & Likelihood of Accomplishing Objectives** – Assuming that requested PD program funds are awarded, will the investigators have the resources, including facilities, to achieve the objectives? (10 points)

- **Research Timetable for Project** – Are the milestones appropriate? Are they achievable? (10 points)
- **Budget** – Is the budget reasonable and appropriate, including support for collaborator activities? (10 points)

Economic Research Proposals will be reviewed and evaluated in the following areas (100 points possible):

- **Objectives of Proposed Research/Relevance** - Are the objectives clearly stated, justified, worthwhile, and reasonable and consistent with priorities outlined in Attachment A? Is the proposed project non-redundant with other research? (25 points)
- **Methodology and Procedures for Accomplishing Objectives (Workplan)** – Is the workplan reasonable, feasible and capable of meeting the stated goals and objectives? Is the workplan likely to yield the targeted data and information (35 points)
- **PI, Co-PI(s) & Cooperators** –Do they have appropriate backgrounds, expertise, experience and capabilities for the proposed tasks? Is the team missing any critical capabilities? (10 points)
- **Research Capacity & Likelihood of Accomplishing Objectives** – Assuming that requested PD program funds are awarded, will the investigators have the resources, including facilities, to achieve the objectives? (10 points)
- **Research Timetable for Project** – Are the milestones appropriate? Are they achievable? (10 points)
- **Budget** – Is the budget reasonable and appropriate, including support for collaborator activities? (10 points)

Due Dates for Submissions

Proposals should be submitted electronically via the internet **no later than Tuesday, January 15, 2008.** Submit proposals online at http://www.pdgrants.ucdavis.edu.

Additionally, for Biological Research Proposals, please submit one paper copy to each funding program. For Economic Research Proposals, please submit one paper copy to the CDFA program only. Paper copies should include all necessary institutional approvals and should be signed by all PIs, Co-PIs, and Cooperators. The paper copies must be postmarked no later than **Friday, January 18, 2008.** The mailing addresses are:

- For the UC Program: UC Statewide IPM Program, Attention Melanie Caruso, Robbins Annex, University of California, One Shields Ave., Davis, CA 95616-8621.
- For the CDFA Program: Pierce's Disease Control Program, Attention Doug West, California Department of Food and Agriculture, 1220 N Street, Room 325, Sacramento, CA 95814.

Proposals that are incomplete, late, or exceed the maximum page length (10 pages + title page, budget, current, planned, pending, and recent PD/GWSS research support, biographies, and citations; 11-point Arial font; one-inch margins) may be eliminated from consideration.

Questions

If you have questions about the CDFA and UC research grant programs, please contact one of the following:

For Submissions to UC
Melanie Caruso
UC Statewide IPM Program
Ph: 530-752-5336
mmcaruso@ucdavis.edu

For Submissions to CDFA
Doug West
Pierce's Disease Control Program
Ph: 916-651-0267
dwest@cdfa.ca.gov

For questions about online submissions, please contact Ms. Melanie Caruso (mmcaruso@ucdavis.edu).

RESEARCH PROPOSAL FORMAT AND GUIDELINES

Proposals must not exceed the maximum page length (10 pages + title page, budget, current, planned, pending, and recent PD/GWSS research support, biographies, and citations). Please use 11-point Arial font, and one-inch margins. Submit online at http://www.pdgrants.ucdavis.edu, where much of the information requested below can be entered in the corresponding blanks or as checked boxes. Electronic submissions are due **no later than Tuesday, January 15, 2008.**

Additionally, for Biological Research Proposals, please submit one paper copy to each funding program. For Economic Research Proposals, please submit one paper copy to the CDFA program only. Paper copies should include all necessary institutional approvals and should be signed by all PIs, Co-PIs, and Cooperators. The paper copies must be postmarked no later than **Friday, January 18, 2008.** The mailing addresses are:

- For submissions to the UC program: UC Statewide IPM Program, Attention Melanie Caruso, Robbins Annex, University of California, One Shields Ave., Davis, CA 95616-8621.
- For submissions to the CDFA program: Pierce's Disease Control Program, Attention Doug West, California Department of Food and Agriculture, 1220 N Street, Room 325, Sacramento, CA 95814.

Project Type
Indicate if this is a Biological Research Proposal or an Economic Research Proposal.

Project Title
Give the title of the proposal. If this is a continuing project and you are changing the title, please explain why.

Signature and Authorization Page
Furnish proof of authorization and agreement to conduct the proposed research by providing required institutional approvals and signatures of the PI, Co-PIs, and Cooperators. (Note: This applies to mailed paper copies only, not electronic submissions.)

Principal Investigator (PI)
Please see the definitions for PI, Co-PI and Cooperator on page 2. Indicate the PI, i.e., the person responsible for overall project management, coordination, and execution. Include institutional affiliation, address, phone number, and e-mail address.

Co-Principal Investigators (Co-PIs)
Include institutional affiliations, addresses, phone numbers, and e-mail addresses. Indicate the roles of each Co-PI and make sure that each Co-PI is aware of his/her proposed participation.

Cooperators
Indicate the roles of each cooperator, and make sure they are aware of their proposed participation.

Research Area
Indicate, from the following list, the one primary research area in which the project falls, as well as any secondary areas:

- Crop Biology
- Disease Epidemiology
- Pathogen Biology & Ecology
- Pathogen & Disease Management
- Vector Biology & Ecology
- Vector Management
- Vector/Pathogen Interaction
- Economic Effects
- Other

Expected Duration of Project
Indicate the number of years for which funding is requested (three years maximum).

Budget Summary
Supply the budget total for each year requested.

Keywords
Supply important keywords that characterize this project.

Project History
Indicate if this is a new or continuing project. If a continuing project, indicate when it began, the number of years of activity, and the sources of funding. Also, indicate how this project relates to other past, current, and anticipated future research projects. Summarize previous work in this area.

Clarification About Progress Reports: Please be advised that progress reports should not be included as part of your submission. Instead, use the sections entitled "Project History" and "Summary" to briefly discuss any previous work on your project that is relevant to the present proposal.

Summary
Include a summary of this project (approximately 100 words).

Objectives of Proposed Research and Path to Application
State the aim or broad goal of the proposal, followed by a numbered list of specific objectives. After the specific objectives provide a summary of the potential impact and relevance of the proposed research, covering the points indicated below.

- Biological Research Proposals: Describe how the project's findings will lead to practical applications in California winegrape production and describe the steps that must be taken to achieve field application. Provide an estimate of the timeframe involved. Describe how the overall project and each objective address the fundamental goal of solving the Pierce's disease problem in California. Cite relevant literature. Describe the project's relevance to the research recommendations from the CDFA PD Research Scientific Advisory Panel in their recent report entitled "PD/GWSS Research Scientific Review" (See Attachment A).
- Economic Research Proposals: Describe how the research will further the understanding of the economic consequences of PD or the economics of potential PD solutions, and how the research can lead to better solutions to the PD problem. Describe how the overall project and each objective address the fundamental goal of solving the Pierce's disease problem in California. Cite relevant literature. Describe the project's relevance to the research recommendations from the CDFA PD Research Scientific Advisory Panel in their recent report entitled "PD/GWSS Research Scientific Review" (See Attachment A).

Methodology to Accomplish Objectives
- Biological Research Proposals: Discuss the experimental procedures for each objective. Discuss laboratory experiment or plot design, expected results, statistical analyses, methods to be used, and parameters of data collection, including sampling methods. Cite relevant literature.
- Economic Research Proposals: Explain the approach to be taken and be specific with respect to research methods, data collection, and statistical analysis. Cite relevant literature.

Research Timetable
Outline the timeline for the research project, indicating start dates, periods of activity, and completion dates for each activity and objective, and for the entire project.

Research Capacity and Likelihood of Accomplishing Objectives

Summarize how the principal investigators' and cooperators' research capacities (i.e., dedicated financial sources, computer facilities, laboratory and field resources, and human resources) and previous work make the proposed work feasible and increase the likelihood for accomplishing the stated objectives.

Intellectual Property

Describe any intellectual property, other than copyrighted publications, that this project is likely to produce, and provide information or a URL describing your institution's policies for managing intellectual property. In addition, describe any proprietary technologies, including methodologies, that your research will necessarily use or incorporate and the steps, if any, that may be required in order to use these proprietary technologies for practical field applications of the project's research results. Researchers should also note that the Public Intellectual Property Resource for Agriculture (www.pipra.org) is available for consultation on PD/GWSS intellectual property issues. See Attachment B for more information about intellectual property and data sharing.

Current, Planned, Pending, and Recent PD/GWSS Research Support

Use the following format to identify support for your current, planned, pending, and recent projects that have any component of PD or *Xylella* vector research.

- Provide information on all current, planned, pending, and recent projects, whether or not there is a specific time commitment by a PI or Co-PI. Where there is a time commitment (with or without a salary provision) indicate the percentage of time on an annual basis.
- Explain any connections and/or overlaps between existing and/or pending support and this submitted proposal. How will the total support package tie together?
- If there are no other current, planned, or pending PD-related projects, state "NONE."

PD/GWSS-related current projects

Name	Supporting agency & project number	Total budget	Effective & expiration dates	Percent of time committed	Project title
(PIs and Co-PIs)					
(PIs and Co-PIs)					

PD/GWSS-related projects that are planned (within the next 6 months) or for which funding is pending, and recent (past 5 years) projects for which funding was received

Name	Supporting agency and project number	Total budget	Proposed effective & expiration dates	Percent of time committed	Project title
(PIs and Co-PIs)	This proposed project				
(PIs and Co-PIs)					

Biographical Sketches

Include a brief biographical sketch for each PI and Co-PI. List 15 of his/her most recent publications (not just those relating to the current project). Maximum of two pages per PI or Co-PI, excluding the list of publications.

Budget Request

- For Biological Research Proposals: Present the budget in both the UC and CDFA formats.
- For Economic Research Proposals: Present the budget in the CDFA format only.

Indirect costs will not be covered by either program and should not be included.

Budget format for the UC Pierce's Disease Research Grants Program
Prepare a budget page using the form CSREES 2004 and a detailed budget narrative, following the instructions for the form (see http://www.ipm.ucdavis.edu/FORMS/ for forms and instructions). Although funding is approved and transferred on a yearly basis, note your needs for the length of the proposed project (maximum of three years). Note that:

- All budget categories for which support is requested must be individually listed (with costs) in the same order as the budget and justified in a budget narrative.
- "Nonexpendable Equipment" and "All Other Direct Costs" categories must be itemized and the cost per item must be provided.

Budget format for the CDFA Pierce's Disease and Glassy-winged Sharpshooter Board
Present the budget using the following form. Do not put amounts in shaded areas. Include a narrative explanation and justification of budget items.

	% of Time on Project	Amount ($)	% of Time on Project	Amount ($)	% of Time on Project	Amount ($)	**TOTAL**
Personnel							
Professional							
SRA/Tech							
Lab Assistant							
Other							
Employee Benefits							
SUBTOTAL (Personnel + Benefits)							
Supplies and Expenses							
Equipment							
Travel							
Computer Time							
Other							
Indirect Costs*							
SUBTOTAL (Supplies, Expenses, Equipment, etc.)							
TOTAL							

(*Indirect costs cannot be covered by CDFA.)

Literature Cited

Include a list of literature cited in the research proposal. Provide complete citations (authors, year published, full title, journal or book title, and inclusive page numbers). Within the proposal, cite references by author and year.

Additional Forms Required by the UC Program

The following CSREES certifications may be required (see http://www.ipm.ucdavis.edu for copies) for inclusion with the budget submission to the UC program:

- **Recombinant DNA or RNA Research**
  All key personnel listed in a proposal and all endorsing officials of the proposing organization are required to comply with the National Institutes of Health "Guidelines for Research Involving Recombinant DNA Molecules." For proposals recommended for funding, Institutional Biosafety Committee approval is required before funds will be released. Complete form CSREES-2008 (section A).

- **Animal Care in Research and Human Subjects Research**
  Form CSREES-2008 (section B) will be required if a project involves the use of living vertebrate animals for experimental purposes. For proposals recommended for funding involving the use of live vertebrate animals, Institutional Animal Care and Use Committee approval is required before funds will be released.

  CSREES-2008 (section C) will be required if a project requires the use of human subjects. For proposals recommended for funding involving use of human subjects, Institutional Committee approval is required before funds will be released.

- **Other Required Certifications**
  Institutions (other than the University of California) receiving awards must provide required certifications set forth in 7 CFR Part-3017, regarding Debarment and Suspension and Drug-Free Workplace (AD1048). Form CSREES-2006 is required to indicate the candidate's opinion of whether the project may require an Environmental Assessment and Environmental Impact Statement, as outlined in 7 CFR Part 3407.

RESEARCH PRIORITIES

(from: PD/GWSS Research Scientific Review, Final Report, August 2007,
Research Scientific Advisory Panel)

Research proposals that address the following key research areas will be given funding priority by the CDFA program. Proposals in other areas will not be rejected *a priori*. However, all proposals must include an explanation of how the proposed research can lead to reductions in the PD problem and development of a sustainable PD management strategy. Both the CDFA and UC programs will take into account the perceived applicability of the anticipated results when making awards.

BIOLOGICAL RESEARCH PRIORITIES

Exploiting *Xylella fastidiosa* (*Xf*) virulence factors to control Pierce's disease. In the last four years, several labs have participated in the effort to knock out *Xf* virulence genes and/or overexpress them, followed by testing the mutant strains for virulence on grape. This work has led to several important insights that can potentially be applied to new PD control strategies. Various transgenic and non-transgenic strategies can be envisioned for interfering with the function of protein-based factors, and thus conferring resistance to *Xf* infection; however, most research projects have not yet advanced to the point of demonstrating such a control method.

Priority areas include:

- Use of Diffusible signal factor (Dsf) for disrupting *Xf* colonization, including delivery by plant associated microbes, transgenic rootstocks, and application of chemical analogs.
- Inhibition of *Xf* polygalacturonase (PG). This research area includes identification of PGIPs with high activity against *Xf* PG, delivery of PGIP to grape plant scions from transgenic rootstocks, and development of small molecule inhibitors of *Xf* PG.
- Targeting other *Xf* proteins required for virulence. This research area includes development of protein/peptide-based inhibitors of cell surface proteins such as pilins and adhesins, along with identification of chemical inhibitors of these proteins.

Biological control of GWSS using parasitoids. The use of parasitoids to reduce population densities of GWSS continues to show promise, especially in settings where synthetic insecticidal sprays cannot be used (e.g. organic farms, urban areas, or other non crop habitat). The labor-intensive methods required to produce parasitoids are currently a major limitation of this approach.

Priority areas include:

- Production of parasitoids, with a particular emphasis on developing efficient means of mass producing GWSS eggs or an alternative suitable host for large-scale production of parasitoids.
- The utility of natural enemies (with an emphasis on native and introduced parasitoids) to suppress PD should be measured, particularly with respect to impact on GWSS populations in the field and under diverse environmental conditions (cultural practices and climatic differences). Further work should be conducted to quantify the value of natural enemies as an integral component of PD disease control programs in urban and rural communities. Further, limited research on conservation of existing parasitoids is warranted (e.g. by understory plantings that provide key resources, nectaries, over-

wintering sites, etc.). The evaluation of new, imported species of parasitoids should focus on realistic assessments of their potential for greater impacts on PD than from currently established natural enemies (such as with the aid of models). Potential agents hypothesized to be more effective early in the season and suited to the California climate should be a priority. The potential impact of imported parasitoids on native non-pest leafhoppers should be assessed before release is allowed, using realistic host specificity trials.

The role of *Xf* genotype in vector and plant transmission and virulence. There is a need for better understanding of the distribution, abundance, and movement of strains of *Xf* in agricultural and nonagricultural settings.

Priority areas include:

- Development and deployment of efficient *Xf* genotyping tools for monitoring *Xf* presence in GWSS populations, non crop plants, and crops. Studies involving *Xf* genotyping are necessary at the local population as well as regional level.
- Integration of *Xf* genotype data into the CDFA GIS database.
- Epidemiological analyses of Pierce's disease outbreaks in relationship to presence of specific *Xf* genotypes and their abundance in adjacent crop and non-crop plants, and GWSS populations.

Host resistance to Pierce's disease. In annual crop species, the most cost effective and environmentally safe method for preventing disease is breeding for resistance. Such traditional breeding can be dramatically accelerated if the genes controlling resistance have been linked with DNA-based molecular markers that can be scored in a high throughput fashion. A second area that merits more attention in the short-term is collection and dissemination of information on PD resistance in existing commercial varieties of grapes. There appears to be significant anecdotal information about which commercial grape varieties are most susceptible to PD, but it does not appear that any one has performed a carefully controlled study of commercial grape varieties and disseminated the results.

Priority areas include:

- Marker Assisted Selection-based breeding for resistance. The RSAP recommends recruitment of additional breeders so that genes in addition to PdR1 can be mapped, tagged with molecular markers, and the process of introgression into multiple commercial backgrounds initiated.
- Assessment of PD resistance in existing commercial grape varieties. The RSAP envisions greenhouse studies employing both GWSS-mediated inoculations in one set of experiments and mechanical inoculations in another set, to distinguish between resistance derived from reduced attractiveness to the vector versus reduced susceptibility to colonization by the bacterium. Data on both PD symptoms and *Xf* growth should be obtained to distinguish also between tolerance and resistance, as tolerant varieties could become problematic reservoirs of the pathogen.

ECONOMIC RESEARCH PRIORITIES

Economic analysis of the impact of PD/GWSS on agriculture, both in terms of real and potential economic effects and economic losses due to PD and the effects of current and prospective control measures, including losses to growers and other market participants.

These specific topics are illustrative and are not listed in priority order:

- Modeling and measuring the economic effects of the current PD/GWSS disease situation. How has PD/GWSS affected costs, acreages, prices and quantities? How much cost has been incurred so far and who has incurred those costs among consumers, producers, taxpayers, and other stakeholders by crop?
- What are the economic lessons from diseases other than PD/GWSS in terms of economic impacts of the diseases themselves and economic lessons about control approaches and policies?
- What are the impacts on disease control and economic effects of alternative government and industry-wide policies for dealing with PD/GWSS? What policies complement alternative research and development strategies?
- Simulating alternative ex ante scenarios of the economic effects if PD/GWSS were to continue unabated. What are the likely impacts on costs, acreages, prices and quantities? How much cost is likely to be incurred, who is likely to incur those costs among consumers, producers, taxpayers, and other stakeholders by crop?
- Evaluate, in an ex ante sense using simulation models, the likely contributions of alternative investments in PD/GWSS research and development. Such a project could evaluate the potential contributions of several alternative R&D efforts that have different impacts on control of PD/GWSS and different time horizons. Such a project would not attempt to evaluate the likely scientific merit of alternative research efforts, but rather assess the payoff for the industry, including consumers, if reasonable success is obtained.

Supplemental Page for All Biological Research Proposals

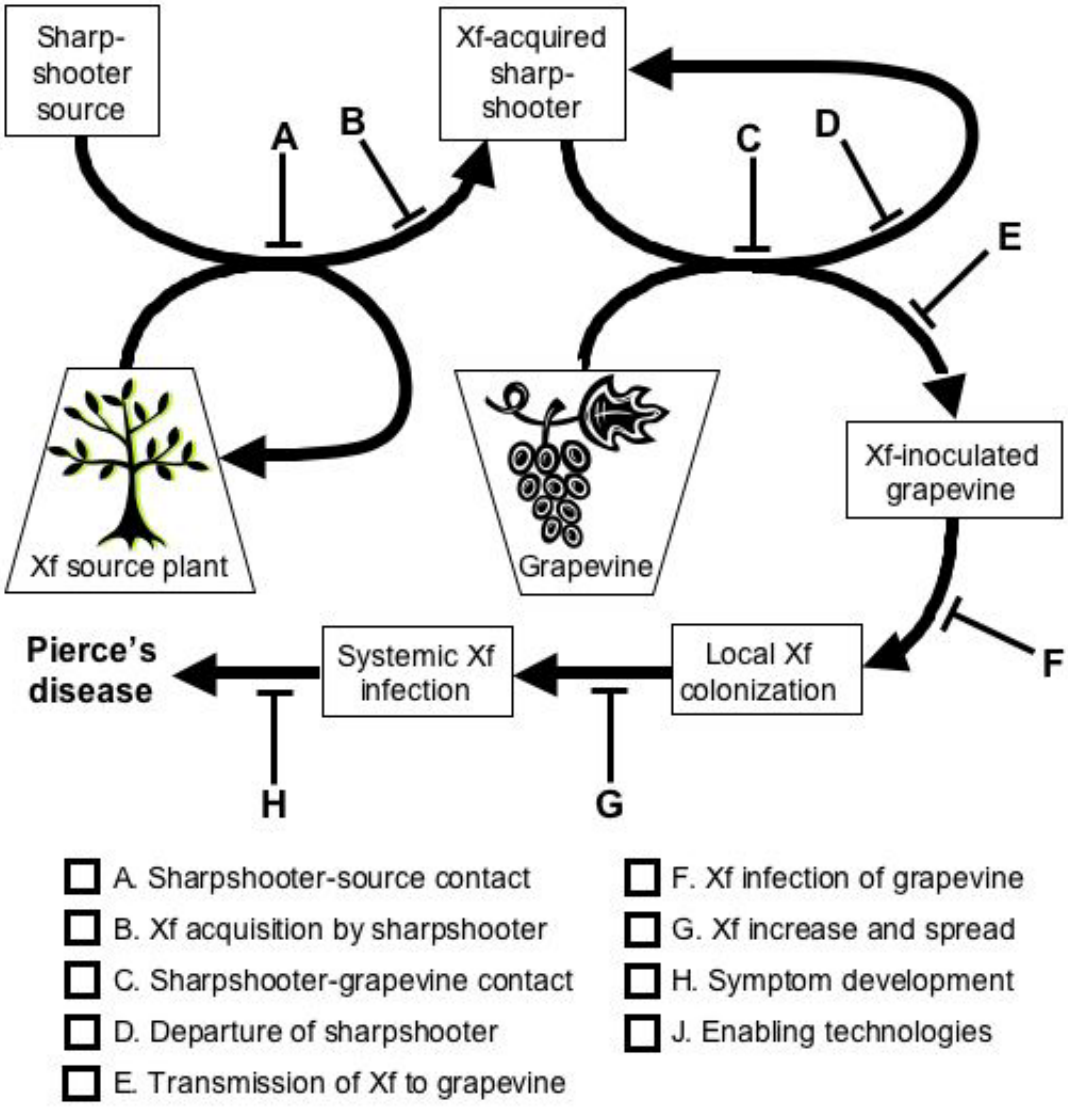

Figure 1. Events leading to the development of Pierce's disease.

Selection of Pierce's disease control objective(s): Fig. 1 above summarizes the events in the *Xylella fastidiosa* infection cascade leading to the development of Pierce's disease of grapevine. A viticulture tool or practice or other control measure that can interrupt or prevent any of these events presumably has the potential to contribute to the goal of controlling Pierce's disease.

Each applicant submitting a Biological Research Proposal is requested to indicate the relevance of the proposed research by identifying one (preferably) or up to three events diagrammed in Fig. 1 as the direct or indirect target(s) against which anticipated research results are directed. Identify the most relevant event by marking the corresponding box with the number 1. If the anticipated research results are expected to affect significantly one or two other events, mark other boxes accordingly with "2" or "2" and "3." Some proposed projects may

not be targeted even indirectly to a specific event in the infection course but rather may be aimed at developing technology that will assist generally in meeting the goal of Pierce's disease control, i.e., an enabling technology (box J). To assist the applicant in defining the area of his or her proposal, examples, which are intended only as examples, are given below.

- A project is aimed at developing more effective methods for killing sharpshooters or identifying and eliminating *Xf* source plants – mark "1" in box A.
- A *Xf*-colonizing bacterial strain is to be developed that competes with *Xf* and prevents *Xf* acquisition by the sharpshooter – mark "1" in box B
- A project is aimed at developing a grapevine line that produces a sharpshooter repellent; mark "1" in box C.
- A project is aimed at developing a bacterial spore that is to be sprayed on grapevines to infect sharpshooters and greatly reduce their ability to continue spread of *Xf* – mark "1" in box D.
- A chemical spray is to be developed that interferes with the ability of sharpshooter-delivered *Xf* to form colonies in the xylem – mark "1" in box E.
- A transgenic grapevine is to be created in which *Xf* is to be confined by a biofilm-binding protein to the initially colonized vascular element – mark "1" in box F.
- A low molecular weight inhibitor of a *Xf* enzyme is to be synthesized in grapevine by alteration of a secondary metabolite pathway, resulting in confinement of *Xf* to the initially infected xylem element – mark "1" in box G
- A chemical spray is to be developed that will counteract the effects of a *Xf* toxin that contributes to development of Pierce's disease symptoms – mark "1" in box H
- A drench is to be developed that will result in root uptake and systemic spread of an antibiotic that kills *Xf* cells – mark "1," "2," and "3" in boxes E, F and G
- A transgene system is to be developed for expression of proteins in grapevine rootstock that are efficiently delivered to the xylem and transported into the scion – mark "1" in box J, "2" in box E and "3" in box F

INTELLECTUAL PROPERTY, DATA SHARING, AND PROGRESS REPORTS

Intellectual Property and Data Sharing

(From: Plant Genome Research Program RFA for FY 2007, Program Solicitation NSF 07-531, National Science Foundation)

Describe the management of intellectual property rights related to the proposed project, including plans for sharing data, information, and materials resulting from the award. This plan must be specific about the nature of the results to be shared, the timing and means of release, and any constraints on release. The proposed plan must take into consideration the following conditions where applicable:

-- Sequences resulting from high-throughput large-scale sequencing projects (low pass whole genome sequencing, BAC end sequencing, ESTs, full-length cDNA sequencing, etc.) must be released according to the currently accepted community standard (e.g. Bermuda/Ft. Lauderdale agreement) to public databases (GenBank if applicable), as soon as they are assembled and the quality checked against a stated, pre-determined quality standard.

-- Proposals that would develop genome-scale expression data through approaches such as microarrays should meet community standards for these data [for example, Minimum Information About a Microarray Experiment (MIAME) standards; see http://www.mged.org/Workgroups/MIAME/miame.html]. The community databases (e.g. Gene Expression Omnibus) into which the data would be deposited, in addition to any project database(s) should be indicated.

-- If the proposed project would produce community resources (e.g. epidemiological data, genotyping data, biological materials, software, etc.), these resources should be made available to the research community in a timely fashion. The timing of release should be stated clearly in the proposal, and how the resources will be disseminated should be described. The resources produced must be available to all segments of the scientific community, including industry. A reasonable charge is permissible, but the fee structure must be outlined clearly in the proposal. If accessibility differs between industry and the academic community, the differences must be clearly spelled out.

The Bermuda / Ft. Lauderdale agreements can be found online at http://www.ornl.gov/sci/techresources/Human_Genome/research/bermuda.shtml and http://www.wellcome.ac.uk/assets/wtd003207.pdf

Progress Reports

Funded researchers may be required to submit project information, including progress reports, publications, and links to project-related sequence data, onto a password-protected website that is currently under development.